NEW MEXICO STATE UNIVERSITY

OBSERVATORY

BOX Y
UNIVERSITY PARK
NEW MEXICO USA 88070

TELEPHONE:
LAS CRUCES, N. M.
505-646-2611

SEMI-ANNUAL REPORT NO. 11

Grantee

New Mexico State University
University Park, New Mexico

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Title

CONTINUED PHOTOGRAPHIC PATROL AND STUDY
OF THE
PHYSICAL CONDITIONS OF THE MOON AND PLANETS

Grant NsG-142-61

Period
15 April 1966 to 14 October 1966

Clyde W. Tombaugh
Principal Investigator

1.0 Summary of Work

1.1 Observations

Several of the planets were poorly placed for observation during this period, especially Mars and Jupiter, which were near conjunction with the sun.

A total of 597 plates was taken during the six-month period of this report.

1.1.1 Mercury

A total of 47 plates was taken of Mercury on 25 days, all in red light, during the brief periods of adequate elongation from the sun.

1.1.2 Venus

A total of 236 plates was taken of Venus on 109 days. Two hundred fifteen plates were taken in ultraviolet light, 13 in blue, 3 in deep infrared (I-Z), 2 in near infrared (I-N), 2 in red, 1 in green light.

1.1.3 Mars

Six test plates were taken of Mars on three nights, 3 in ultraviolet, 1 in blue, 1 in green, and 1 in red light.

1.1.4 Jupiter

A total of 206 plates was taken of Jupiter on 72 nights. One hundred fifteen plates were taken in blue light, 59 in red, 25 in green, 5 in ultraviolet, and 2 in infrared light.

1.1.5 Saturn

A total of 74 plates was taken of Saturn on 40 nights. Forty-two plates were taken in green light, 20 in blue, 11 in red, and 1 in infrared light.

Visual observations of Saturn were made on 25 nights by Tombaugh. The appearance was recorded on notes and nine drawings. Saturn went through its autumnal equinox on 15 June, and special attention was given to the aspect of the narrow ring and shadow.

1.1.6 Uranus

Ten plates were taken of Uranus on six nights, 6 in green light, 3 in blue, and 1 in red light.

1.1.7 The Moon

A total of 18 plates of the moon was taken on six nights, all in blue light.

1.2 Reduction of Data and Studies

1.2.1 Mercury

Twenty-six composites were made of Mercury. Markings are visible on some of the composites, but lack of time has not permitted much positional measurements as yet.

1.2.2 Venus

Copies of 26 composites of Venus were sent to each of the International Planetary Plate Depositories at Flagstaff and Meudon during this period. This brings the grand total to date to 66.

1.2.3 Mars

The positional measurements of discrete features identifiable on the 1965 plates were continued. The areographic location of many features of marginal visibility was found to be greatly facilitated by measuring cronapaque prints of composite copies rather than the original plates. The study of the 1965 white areas, including the north polar extent, was also continued.

Copies of 114 composites of Mars were sent both to Flagstaff and Meudon during this period. This brings the grand total of Mars to date to 324.

1.2.4 Jupiter

The longitude of the Red Spot was measured on 25 plates, and the latitude on 65 plates. Measurements of other Jovian features were made on 25 plates.

Increased computerization of data reduction and analysis is being achieved, using the University's Control Data 3300 Computer. Analysis of Red Spot measurements made during the 1965-1966 apparition has been partially completed.

Study of the Red Spot was of prime importance. The Red Spot has been fading markedly, and is now quite indistinct. Coupled with a prominent darkening of the South Tropical Zone on each end of the Red Spot, the length of the Red Spot decreased from 21^{o} in May to less than 18^{o} in October, 1966.

Three hundred seventy-nine composites were made of Jupiter during this period.

1.2.5 Saturn

Several changes have occurred in the belt system of Saturn, which were recorded both photographically and visually.

1.2.6 Uranus

Two composites were made of Uranus.

2.0 Planetary Conferences

Smith visited the Observatoire de Meudon and the Observatoire du Pic du Midi between 13 July and 31 July for discussions with A. Dollfus and J. H. Focas (Meudon) and H. Camichel and C. Boyer (Pic du Midi). Discussions at Meudon included international cooperative programs for the observation of Mars and Jupiter, with emphasis on the contributions to be made by the New Mexico State University Observatory and the French personnel at Meudon operating instruments at Meudon, Nice, and Pic du Midi. Discussions at Pic du Midi included cooperative observations of Venus as well as general techniques used in planetary photography.

3.0 Publications

3.1 Smith, Bradford A., 1966, "Rotation Numbers for Jupiter - Apparition of 1965-66." Contr. Obs. New Mexico State Univ. - Special Series, No. 2.

4.0 Personnel

4.1 Dr. C. W. Tombaugh has continued on half-time teaching status at New Mexico State University and as co-supervisor of the planetary research project.

4.2 Bradford A. Smith has continued as Director of the Observatory and co-supervisor of the planetary research project.

4.3 J. C. Robinson has continued full-time on the reduction and study of the Mars photographs.

4.4 C. F. Mozer has continued as assistant physicist, but on a half-time basis.

4.5 T. C. Bruce has continued as assistant analyst.

4.6 E. J. Reese resigned on 30 June 1966.

4.7 R. L. Fritz has been promoted to chief photographic technician.

4.8 A. S. Murrell has continued as chief observer.

4.9 T. P. Pope has continued as full-time observer.

4.10 R. B. Minton has continued as full-time photographic technician.

4.11 T. B. Kirby continued as part-time assistant as a graduate student in physics.

4.12 C. A. Richey resigned 31 May 1966.

4.13 W. E. Bains and H. G. Solberg have continued as part-time assistants as undergraduate students in physics.

5.0 Fiscal Status

The estimated balance remaining in the grant as of 30 September 1966 was $57,626.79.